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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/593,765	06/14/2000	Hisashi Ohtani	0756-2149	8038

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EXAMINER
NGUYEN, CUONG QUANG

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/593,765	OHTANI ET AL.	
	Examiner	Art Unit	
	Cuong Q Nguyen	2811	

-- The MAILING DATE of this communication app ars on the cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-60* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 U.S.C. § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 6-11, 13-18, 20-26, 28-30, 48- 51, 53, 54, 55, 56, and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Hsieh (US 5,153,142) in view of Tran et al. (US 5,273,910).

Hsieh discloses a semiconductor device comprising: a doped polysilicon layer (14) formed on a surface of an insulating layer (12), the polysilicon layer including source/drain regions, and a channel region in therebetween; a gate insulating film (16) formed on the poly silicon layer; a gate electrode (18) formed on the gate insulating film; a first insulating film (20, an inorganic silicon oxide layer) covering at least semiconductor layer and gate electrode except for contact holes opened therein; an electrode (32, an aluminum layer) formed over the first insulating film and connected to one of source/drain regions; a transparent pixel electrode (30, an ITO layer) formed

over the second insulating film, wherein the pixel electrode electrically connected to the electrode and is located under the electrode. See Hsieh's Fig.8.

Hsieh does not teach that the layer (14) is a single crystal silicon layer which includes a first impurity region, a second impurity region, and a channel region in therebetween; a second insulating film of a polyimide organic resin layer formed between the electrode, pixel electrode and the first insulating film.

Tran discloses a semiconductor device comprising: a semiconductor layer (42) can be formed of a single crystal silicon or a polysilicon layer on a surface of an insulating layer (51), the semiconductor including a first impurity region (45), a second impurity region (46), and a channel region in therebetween; a gate insulating film (43) formed on the semiconductor layer; a gate electrode (49) formed on the gate insulating film; an insulating film (a planarization layer 53) formed over the insulating surface, the planarization layer is planarized by coating with a second insulating film (a coating layer of polyimide organic resin layer); the insulating film (53) layer can be a double or triple layer. See Tran's Fig.5b and col.10 lines 8-32 and col.9 lines 60-64 and col.10 lines 1-30.

It would have been obvious to one of ordinary skill in the art to form the layer (14) in Hsieh's device of a single crystal silicon layer instead of polysilicon layer as taught by Tran et al. because single crystal silicon and polysilicon are common materials for forming the channel region in the thin film transistor device and they are

interchangeable. It also would have been obvious to one of ordinary skill in the art to coat the inorganic first insulating film (20) in Hsieh's device with a polyimide layer as taught by Tran in order to obtain a smooth planarization layer (see Tran's col.10, lines 8-32). One of ordinary skill would have been motivated to do so because it is easier to form other element such as metalization on top of a smooth planarization interlayer insulating film than an uneven surface interlayer insulating film as shown in Hsieh's device.

The limitation "wherein said channel region is formed so as to exclude a region where a catalyst element is introduced" in claim 1, 8, 15, 23, 31, 36, 42, 48, and "wherein said catalyst element is one selected from the group consisting of Ni, Pd, Pt, Cu, Ag, Au, In, Sn, P, As, and Sb" in claims 53-60 are taken to be a product by process limitation, it is the patentability of the claimed product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324,326(CCPA 1974); In re Marosi et al., 218 USPQ 289,292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process

steps, which must be determined in a "product by process " claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in "product by process" claim or not. As shown in present invention Fig. 1A and Fig. 2B, Applicants used a method such as introducing the catalyst element in a region (206) outside the channel region in order to crystallize the channel region. The final structure of device being formed by the combination of Hsieh and Tran et al. also has a crystallized channel region which is identical as claimed device. So the method such as introducing the catalyst element in a region (206) outside the channel region in order to crystallize the channel region does not make the claimed device different than the device being formed by the combination of Hsieh and Tran et al.

Claims 5, 12, 19, 17, 31-47, 52, 57, 58, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Hsieh in view of Tran et al. and further in view of Liauh (US 5,027,185).

Hsieh and Tran teach all the limitations of claims 1-4, 6-11, 13-18, 20-26, 28-30, as shown above. However, Hsieh and Liauh do not teach that the conductor comprises a second conductive film of TiN.

Regarding claims 5, 12, 19, 27, 31-35, 52, Liauh discloses a semiconductor device having electrodes connected to source/drain regions (3) comprise a first

conductive film (11, an Al layer) and a second conductive film (10, a TiN layer) between the first conductive film and source/drain regions. See Liauh's Fig.8.

It would have been obvious to one of ordinary skill in the art to form the electrode of double layer TiN/Al as taught by Liauh because TiN layer acts as a barrier layer to prevent the migration of Al layer into the silicon source /drain regions which causes the junction spiking. See Liauh's col.2, lines 44-49.

Regarding claims 36-41, as above the electrode is formed of a TiN layer under an Al layer, therefore it is inherent that the TiN is interposed between the pixel electrode and the Al layer.

Regarding claims 42-47, as shown in Hsieh's Fig.8, another electrode formed the same material as the electrode connected to another source/drain region.

Response to Arguments

2. Applicant's arguments with respect to claims 1-52 have been considered but are not persuasive for the reason as discussed above.

Conclusion

3. Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax C nter number is (703) 308-7722

and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

4. Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to CUONG Q NGUYEN whose telephone number is (703) 308-1293. The Examiner is in the Office generally between the hours of 6:30 AM to 5:00 PM (Eastern Standard Time) Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor TOM THOMAS who can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722 or 308-7724.

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center Receptionists whose telephone number is 308-0956.

Cuong Nguyen

Primary examiner

September 3, 2003